

Appl. No. 09/805,620

REMARKS

Claims 22-47 are pending in the application with claims 22, 27, 38, 41, 43, 44, and 47 amended herein.

Claims 1-37 and 40-47 stand rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. Applicant requests reconsideration. Applicant presumes that the Office intended to reject claims 22-35 and 40-47. Review of Figs. 1, 3, 4, and 6 of the present application reveal that purge exit ports 22 and 34 are formed within lid 6 and are accordingly, not "downstream" from the substrate as alleged on page 3 of the Office Action. The text associated with the listed figures as well as the figures themselves show injecting purge material through the purge exit ports into the deposition chamber. At least for such reason, Applicant requests withdrawal of the written description rejection in the next Office Action.

Claims 22-35 and 40-47 stand rejected under 35 U.S.C. 102(e) as being anticipated by Ohashi. Applicant requests reconsideration.

Amended claim 22 sets forth an ALD method that includes, among other features, injecting purge material through a purge exit port into a deposition chamber, providing a solid barrier wall inside the chamber to separate the injected purge material from a substrate holder, and forming a purge curtain from the injected purged material. The solid barrier wall extends into the chamber from at least one of the chamber walls to elevationally below a substrate on the substrate holder. The amendments to claim 22 are supported at least by paragraphs 44 and 46 respectively discussing ALD and elevational positioning of a substrate holder, such as shown in Figs. 1 and 4 of the

Appl. No. 09/805,620

present application. Pages 3-4 of the Office Action allege that Ohashi discloses each and every limitation of claim 22. Applicant traverses.

Review of Ohashi reveals that such reference fails to disclose or suggest an ALD method. Also, Ohashi fails to disclose or suggest that hollow annular portions 21 or 829 of respective Figs. 6 and 8 extend to elevationally below wafer substrate W. At least for such reasons, Ohashi fails to disclose each and every limitation of claim 22 and does not anticipate claim 22. Claims 23-26 and 40 depend from claim 22 and are not anticipated at least for such reason as well as for the additional limitations of such claims not disclosed.

Amended claims 27 sets forth an ALD method that includes, among other features, injecting a deposition precursor into a deposition chamber, exposing a substrate to the precursor, and chemisorbing only one monolayer of precursor material on the substrate in the absence of another deposition precursor. The method includes, while injecting the precursor and chemisorbing the monolayer, separately injecting a purge material through a purge exit port into the chamber, separating the injected purge material from the substrate holder with a flow director, and minimizing backflow of the injected purge material towards the substrate holder. The injected purge material flows along at least a portion of the chamber walls. At least paragraphs 3, 4, 26, and 27 of the present specification support the amendment to claim 27. Pages 3-4 of the Office Action allege that Ohashi discloses each and every limitation of claim 27. Applicant traverses.

Review of Ohashi reveals that such reference fails to disclose an ALD method. Accordingly, Ohashi further fails to disclose chemisorbing a monolayer of precursor

Appl. No. 09/805,620

material in the absence of another deposition precursor and, while chemisorbing the monolayer, separately injecting a purge material, as set forth in claim 27. At least for such reasons, Applicant asserts that Ohashi fails to disclose each and every limitation of claim 27 and does not anticipate claim 27. Pages 4-5 of the Office Action rely upon DiMeo as allegedly disclosing certain features of digital CVD. However, Applicant asserts that DiMeo does not disclose or suggest and is not alleged to disclose or suggest separately injecting a purge material while injecting the deposition precursor and chemisorbing the monolayer, as set forth in claim 27. Applicant further asserts that claim 27 is patentable over DiMeo in view of Ohashi. Claims 28-35 depend from claim 27 and are not anticipated by Ohashi at least for such reason as well as for the additional limitations of such claims not disclosed.

Amended claim 41 sets forth an ALD method that includes, among other features, injecting a purge material through a purge exit port into a deposition chamber, forming a purge curtain from the injected purge material, providing a flow director inside the chamber to cause the purge curtain to bypass the substrate holder, and minimizing backflow of the injected purge material towards the substrate holder using the flow director. The flow director extends downward from elevationally above the substrate holder to elevationally below a substrate on the substrate holder. As may be appreciated from the discussion above regarding the deficiencies of Ohashi as applied to claim 22, such reference fails to disclose or suggest each and every limitation of claim 41. At least for such reasons, Ohashi does not anticipate claim 41. Claim 42 depends from claim 41 and is not anticipated at least for such reason.

Appl. No. 09/805,620

Amended claim 43 sets forth an ALD method that includes, among other features, injecting a purge material into a deposition chamber, injecting a first deposition precursor into the deposition chamber, forming a purge curtain from the injected purge material, and providing a flow director extending to elevationally below a substrate on the substrate holder. The method includes exposing a first monolayer to a second precursor and chemisorbing only one monolayer of second precursor material on the first monolayer in the absence of the first precursor not chemisorbed. As may be appreciated from the discussion above regarding the deficiencies of Ohashi, as applied to claim 22, such reference fails to disclose each and every limitation of claim 43. Claims 44-47 depend from claim 43 and are not anticipated at least for such reason as well as for the additional limitations of such claims not disclosed.

At least for the reasons indicated herein, Ohashi does not anticipate claims 22-35 and 40-47 and Applicant requests allowance of such claims in the next Office Action.

Claims 36-39 stand rejected under 35 U.S.C. 103(a) as being unpatentable over DiMeo in view of Ohashi. Applicant requests reconsideration.

Claims 36 and 37 depend from claim 27 established above as patentable over DiMeo in view of Ohashi. Claims 36 and 37 are thus patentable at least for such reason. In addition, the cited combination fails to disclose or suggest the two different purge material injection flow rates set forth in claim 37, i.e. a first flow rate during precursor injection and a second flow rate while precursor injection is ceased.

Amended claim 38 sets forth an ALD method that includes, among other features, injecting a deposition precursor into a deposition chamber through a process

Appl. No. 09/805,620

chemical port in a lid of the chamber, chemisorbing only one monolayer of precursor material on the substrate in the absence of any additional deposition precursor, ceasing delivery of the precursor, and delivering purge material through the process chemical port. The method includes, while delivering the purge material through the process chemical port, separately delivering a purge material through a purge port in the lid, the purge delivery occurring through a dead space as to the process chemical port purge material. The purge port purge material is separated from a substrate holder with a flow director. Pages 4-5 of the Office Action allege that DiMeo in view of Ohashi discloses every limitation of claim 38. Applicant traverses.

Applicant asserts that no motivation exists to combine DiMeo and Ohashi. Page 3 of the Office Action alleges a motivation to modify DiMeo by using the straightening gas of Ohashi to prevent particles from adhering to walls of the chamber, as taught by Ohashi. However, thorough review of Ohashi and comparison to the DiMeo digital CVD process reveals that the particles generated in the Ohashi process do not occur in the DiMeo process. Accordingly, no motivation exists to modify DiMeo by including the Ohashi straightening gas. Further, amended claim 38 expressly sets forth chemisorbing only one monolayer of precursor material on the substrate in the absence of any additional deposition precursor. Pursuant to the express teachings of Ohashi, such reference bears no applicability to the claimed method since the type of particles generated in the Ohashi CVD method do not occur in the claimed method. Thus, those of ordinary skill would not turn to Ohashi to modify an ALD method. Only the Applicants own specification recognizes both the problem particular to ALD and the claimed solution.

Appl. No. 09/805,620

Fig. 3 of DiMeo reveals that providing precursor reactant source 44 is always separated from providing oxidant reactant source 48 by inert purge gas 46. That is, as taught by DiMeo, at no time are precursor reactant source 44 and oxidant reactant source 48 intentionally provided within reactor chamber 10 at the same time. Such a circumstance may be contrasted with the processing shown in Fig. 14 of Ohashi that generates particles. As those of ordinary skill clearly understand from the discussion in column 2, line 44 to column 3, line 8 of Ohashi, the gas phase reaction and formation of particles only occurs in circumstances where reactants are provided together. If only one type of reactant is provided, then such reactant does not react with itself in the gas phase to form particles. Accordingly, those of ordinary skill would consider DiMeo to eliminate the particle generation problem of Ohashi by providing precursor reactant source 44 separate from oxidant reactant source 48, as is conventional during digital CVD. Thus, those of ordinary skill would not find any motivation to modify DiMeo with the straightening gas of Ohashi since it would apparently not provide any benefit in the DiMeo method.

As disclosed in paragraphs 26 and 27, only the Applicant's own specification identifies an advantage to providing targeted purging in ALD where precursors are provided separately. The targeted purging may remove residual precursors that remain in chamber dead spaces after conventional purging between precursor flows. Neither cited reference comprehends such an advantage. Thus, Applicant asserts that the Office's conclusion of obviousness is based on improper hindsight reasoning. Applicant acknowledges that judgments on obviousness may necessarily involve a reconstruction based in a sense on hindsight reasoning. However, such reconstruction

Appl. No. 09/805,620

can only take into account knowledge that was within the level of ordinary skill in the art at the time the claimed invention was made and cannot include knowledge gleaned only from Applicant's disclosure. In re McLaughlin, 443 F.2d 1392, 1395, 170 USPQ 209, 212 (CCPA 1971); MPEP 2145(X)(A). The Office Action does not identify any cited art that recognizes the problem resolved by Applicant's claimed method.

Applicant asserts that some motivation in the art must exist to support a combination of references, that the motivation alleged by the Office does not exist, and that the Office Action does not identify any valid suggestion in the prior art of the desirability of the proposed DiMeo modification. At least for such additional reasons, Applicant asserts that the cited combination cannot be considered to disclose or suggest every limitation of claim 38. Claim 39 depends from claim 38 and is patentable at least for such reason as well as for the additional limitations of such claim not disclosed or suggested. Applicant requests allowance of claims 36-39 in the next Office Action.

Applicant herein establishes adequate reasons supporting patentability of pending claims 22-47 and requests allowance of all such pending claims in the next Office Action.

Respectfully submitted,

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